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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**



Application Number: 08/737,042

Filing Date: October 30, 1996

Appellant(s): HEED, BJORN

Keith H. Orum
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed July 20, 2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

| | | |
|---|---|---|
| 800,500 | ACV (Soviet Union) | 2-1981 |
| 1,339,542 | USHER (Great Britain) | 12-1973 |
| 4,407,357 | HULTGREN | 10-1983 |

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over ACV (SU 800,500) in view of Usher.

ACV discloses a recuperative heat exchanger comprising a casing having inlet and outlet ports 2-5; a heat transfer package having a plurality of connected rectangular planar elements with a corrugated pattern extending the entire length and width thereof, the planar elements

being folded in an accordion-like manner along fold lines 7; but does not disclose corrugations greater than 45 degrees with respect to the longitudinal flow direction.

Usher discloses a heat exchanger for 2 fluids comprising a plurality of rectangular planar elements (Figures 1-4); wherein the angle of the ridges and channels are 30 degrees with respect to the width of the plate (i.e. 60 degrees with respect to the length of the plate) for the purpose of achieving optimal heat exchange (page 3, lines 31-49).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in ACV corrugations extending at an angle more than 45 degrees with respect to the net flow path for the purpose of achieving optimal heat exchange as recognized by Usher.

Claims 7-8 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over ACV in view of Usher as applied to claims 5 and 9 above, and further in view of Hultgren.

The combined teachings of ACV and Usher lacks top and bottom end covering elements.

Hultgren discloses a heat exchanger comprising a casing 2 defined by top and bottom ends 3 and lengthwise 5 and width-wise 4 sidewalls having inlet and outlet ports 7-10; a heat transfer package 11 (20) having a plurality of connected rectangular planar elements 24 with corrugations 17, the planar elements being folded in an accordion-like manner; and top and bottom end covering elements 13 (Figure 1, column 3, line 67 to column 4, line 2) for the purpose of ease of assembly and manufacture.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in ACV top and bottom end covering elements for the purpose of ease of assembly and manufacture as recognized by Hultgren.

**(10) Response to Argument**

With respect to section A of appellant's brief, one skilled in the art of heat exchange ***would*** combine ACV with Usher. The secondary reference of Usher explicitly teaches one of ordinary skill in the art to employ corrugations extending at an angle more than 45 degrees with respect to the net flow path for the purpose of achieving optimal heat exchange. As well known in the art of heat exchange, the corrugations of both ACV and Usher (page 3, lines 28-29) produce turbulence. In essence, the fluid flow is tripped and the thermal boundary layer along the plate is reduced. Usher (page 3, lines 31-49) clearly discloses, in analogous convention, the angle between the corrugations and longitudinal direction of the plate determines the heat transfer coefficient, where an angle greater than 45 degrees provides improved heat transfer by increasing the flow resistance and turbulence along the plate. For example, in the extreme instances, corrugations at an angle of 90 degrees with respect to the longitudinal direction of the plate provides the maximum flow resistance and turbulence to the fluid flow, whereas corrugation at an angle of zero degrees with respect the longitudinal direction of the plate, i.e. aligned with the fluid flow, provides the minimum flow resistance and turbulence to the fluid flow. As disclosed by Usher, an angle of 45 degrees provides an intermediate heat transfer coefficient.

Although, Usher discloses several embodiments where the plural sections are disposed in the longitudinal direction of the plate, the teaching of varying the corrugation angles is applicable to a single section of corrugations as shown in Figures 1-2 of Usher. Appellant is reminded that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed

invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Furthermore, ACV discloses only a single section of corrugations. It is noted the term "nozzle" in appellant's translation of ACV is misdescriptive. The device of ACV is employed in the same environment of appellant's instant invention.

With respect to appellant's argument of achieving "substantially thermally balanced flow distribution," MPEP 2114 states in part, "[A]pparatus claims cover what a device ***is***, not what a device ***does***." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original)." The recitation of "to exhibit a substantially thermally balanced flow distribution" is functional and contained in the "wherein/whereby" clause of the claims. Arguendo, the similar structure of the combination of ACV and Usher will function in a manner similar to appellant's instant invention. Appellant has never argued the device of the combination of references is structurally different than the appealed claims, rather the functionality or problem solved differs. Furthermore, MPEP 2144 states in part, "The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. ***It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant***. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 904 (1991) (emphasis in original)."

Rather than reiterate the Examiner's position with respect to Hultgren, the remarks in the Office action mailed 6/4/2002 are believed applicable. However, the rejection of claims 7-8 and

10-11 merely employ Hultgren as a secondary reference to teach top and bottom end covering elements for the purpose of ease of assembly and manufacture.

Lastly, MPEP 2144 states in part, "The court held "it is not necessary in order to establish a ***prima facie*** case of obviousness . . . that there be a suggestion or expectation from ***the prior art*** that the claimed [invention] will have the same or a similar utility as ***one newly discovered by applicant,***" and concluded that here a ***prima facie*** case was established because "[t]he art provided the motivation to make the claimed compositions in the expectation that they would have similar properties." 919 F.2d at 693, 16 USPQ2d at 1901 (emphasis in original)."

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Leonard R. Leo

LEONARD R. LEO
PRIMARY EXAMINER
ART UNIT 3744

October 30, 2006

Conferees
Eric Keasel, Supervisor EK
John Ford, Primary JF